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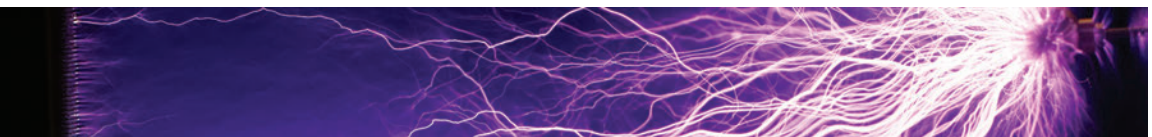
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Openings and Retrospectives



THE CHARGE AGAINST ELECTRICITY

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Electricity has become such a ubiquitous feature of modern life that most of us would have no idea how to manage without it. Interruptions in supply are experienced as unsustainable moments of crisis. The possibility that the supply of electricity might eventually run dry is every government's worst nightmare and underpins the global politics of energy. Do we blame electricity for having brought us to this state of dependency? Can we hold it responsible for the disempowerment of citizens, for the entrapment of their lives within a state-sponsored grid maintained by corporations? Or does it, on the contrary, hold the potential for emancipation? Is electricity guilty or not guilty? In what follows, we begin with the case for the prosecution. Then we present the case for the defense. You, our readers, are the jury, and we leave the verdict for you to decide.

THE CASE FOR THE PROSECUTION

Your Honor:

We charge electricity with gross deception. Aided and abetted by its corporate sponsors, who stand to profit greatly from the illusion, electricity has—

we allege—been complicit in the construction and marketing of a counterfeit reality.¹ This is a world divided on itself, turned outside in and back to front—a world in which the energies, forces, movements and material flows that are necessary for the continuation of life have been alternately imprisoned or expelled, locked into black boxes, behind white walls or under gray pavement, so as to leave a space of consumption purified of all traces of vitality and populated by lifeless and neutered objects, mere simulacra of their real-life counterparts.² In this make-believe world, things work without calling for productive effort on the part of their operators; these efforts are applied without bodily contact with materials at the point of application, and are perceived without sentient engagement in the act of perception.

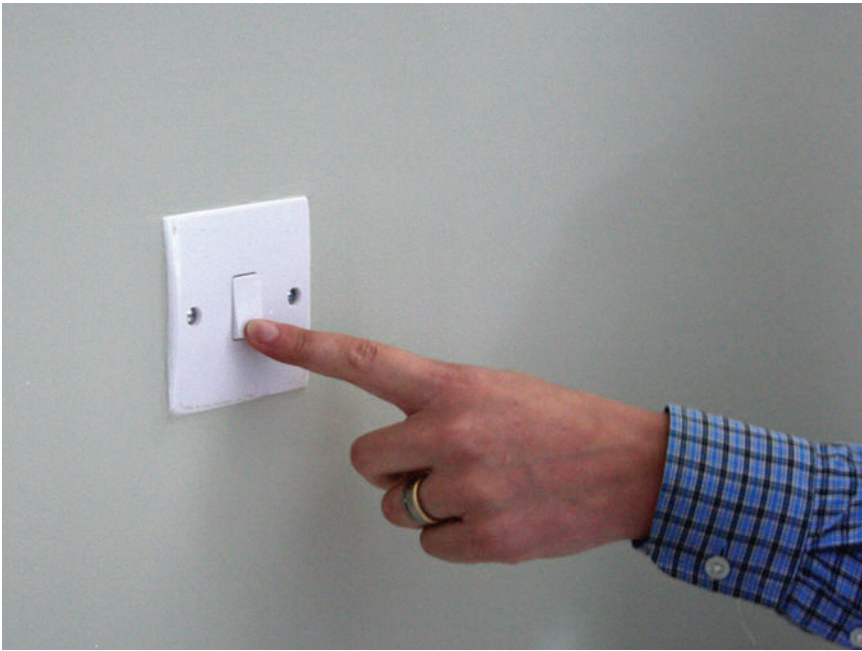


Figure 1. The appearance of a switch and the gesture entailed in its operation give no clue as to the convoluted and volatile human and machine work required to bring light to a room.

Photo by Mike Anusas.

Placed in this world, the human being is configured as an individual consumer whose life is carried on within a bubble, protected from any direct interchange with the environment. Outside the bubble, however—and largely beyond the awareness of the consumer—there lies a massive apparatus of power generation and transmission on which the sustenance of the illusion depends. Here, some of

the most gigantic feats of human engineering grapple with the elemental forces of nature—with earth, air, fire, and water—in the combustion of coal mined from the depths, in the damming of great rivers, in huge turbines set up against the wind, and in reactors that unleash the very energies condensed in matter. The more the illusion has taken hold, the greater the scale of the interventions required to sustain it, to the point that the consequences of these interventions could inaugurate a new geological era in the history of our planet, one of untold destruction.³

We draw attention to four key entailments of electrification. These are *remoteness*, *conduction*, *insulation*, and *sensorial subtlety*. The first—remoteness—signifies a radical transformation in the relationship between generation and application. Once fused in the same site, they have been cast to the two extremities of a line. Consider one obvious example. The coal- or wood-burning locomotive carries an onboard fire that heats the water in its boiler, creating the steam pressure that drives its pistons and wheels. To keep the fire burning, the locomotive's fireman has continually to be shoveling coal or logs from a tender at the rear. As it hurtles along the tracks, the engine is like an ever-exploding bomb in which fuel, fire, pressure, and kinetic energy are all rolled into one. When steam power gave way to diesel, the fireman's job was rendered obsolete; nevertheless, the locomotive was still tanked with its own supply of fuel, the controlled ignition of which took place deep inside the bowels of the engine. The electric locomotive, by contrast, is like the mobile and executive arm of a vast apparatus whose tentacles extend throughout the rail network. Fires still burn, but in place of a great many small fires, one in each engine, there are now a few enormous fires, consuming fuel (principally coal) on a previously unimaginable scale in colossal industrial complexes known as power stations.⁴ Yet the colossus has been dismembered, for with its generative body severed from its limbs at their multiple points of application, it responds only clumsily to their machinations. Connecting body and limbs—that is, the station and all the engines that it powers—are overhead cables from which every locomotive picks up current as it moves. These are lines of conduction.

Conduction is a corollary of remoteness. If the sites of generation and application are removed from one another, then they must be connected by lines physically capable of conveying power from the generative source to the point of consumption. While on the railway these connecting lines are cables, or sometimes conducting rails; for stationary applications they are more commonly wires. Thus the consequence of electrification has been the wiring of those black-boxed



Figure 2. The conduction of electricity is concealed not only by covering up but also by remote positioning. Electricity lines often run high overhead across unpopulated areas so as to be as far as possible from the sphere of everyday perception. Photo by Ian Britton, <https://www.flickr.com/photos/freefoto/4635123089/in/photolist-84AdBk-6j6GCU>.

interiors and whitewashed, gray-paved exteriors that bound the simulacral spaces of consumption. But as wiring became a condition for maintaining these latter spaces, so they, in turn, were rendered wireless. The wires that sustain the bubble the consumer inhabits remain largely out of sight, for were they to be seen, the bubble would immediately burst. That is why corporate design and architectural practice have gone to such lengths to hide them. It may be that we have to plug our appliances in, but what takes place on the other side of the socket is, for the most part, beyond our awareness or comprehension.⁵ In the design of appliances, too, the wiring is generally hidden within opaque and often smooth, shiny coverings. Thus the world the consumer perceives is one of surfaces rather than lines, of occlusion rather than entanglement, of objects rather than things. The thing is a gathering of forces, energies, and materials; it draws us in. But the object turns its back to us, shielding our perception from the messier aspects of the world.⁶ Electrification thus brings about a division between lines of conductivity and surfaces of occlusion. As the latter shine in the limelight of a theatricalized space, the former lurk behind the scenes, beneath the floorboards, in the plastering of walls or in the hidden compartments of objects.⁷



Figure 3. Here, in a modern office environment, lines of electrical conductivity are hidden in an overhead void. We only catch sight of such lines when maintenance is needed, briefly revealing a world of threaded currents. Photo by Mike Anusas.

If electricity is to be contrived to flow along lines, however, then these lines must be insulated or—failing that—suspended or supported in such a way that they can have no contact with the earth. Like blood from the dismembered body, electricity would spill out and be lost were it not channeled within arterial walls that constrain its lineal flow and block its lateral escape. In this regard, conduction and insulation are two sides of the same coin. But like conduction, insulation also has a broader significance, for it sets up a barrier that prevents material contact of any kind, within the spaces of consumption, between users and the world beyond. In effect, it is insulation that seals the walls of the bubble. Any breach is considered a threat to life and limb, while every sealed space or manufactured appliance comes with warnings, accompanied by zigzag icons, of the dire consequences of disobeying instructions not to tamper with the inner workings of things or to trespass beyond approved limits. Electricity fences us in, and through its capacity to shock it enables the power at the center, which controls the supply, to exert an invisible grip on our activity. This grip is commonly known as security. Anyone who breaches security risks electrocution.⁸ To keep safe, consumers must remain within the insulation of their bubbles, on their own, locked into the individual satisfaction of their private passions. Electrification may not be the cause



Figure 4. For electricity to reach populated destinations, its lines must often descend from the sky, settle into the grounds of everyday habitation and transform its state prior to going underground on its way towards and into dwellings. However, the settling process can be volatile; life must be warned off, or risk extermination. Such warnings often employ a high contrast graphic depiction of a human meeting their demise under a merciless icon based on the image of the lightning strike. Photo by Mike Anusas.

of the feeling of personal isolation that is so pervasive in modern life. Our charge, however, is that it has at least contributed to this feeling by freighting with danger any contact with materials beyond the artificially sustained compartments in which lives are contained. Before electricity, human lives were conducted with and through materials. But postelectrification, the more conductive materials are, the less we should have contact with them.

It is its sensorial subtlety that allows electricity to exert its hold so imperceptibly and with such precision. Not only can its material apparatus, wrapped in insulation, be readily hidden from view; it can also be rendered all but impervious to other senses of hearing, touch, and smell. This is partly due to the property of remoteness, for just as the site of application is removed from that of generation, so it is also removed from the sights, sounds, and smells of the industrial power station. Thus electricity is odorless because the noxious fumes released, for example, through burning coal are concentrated at their source, far from the point of consumption. It is noiseless, again, because the churn of turbines echoes not in the home or the office but in distant hills and dales or remote coastlines where wind, hydroelectric, or nuclear facilities are typically located. Electric current makes no sound as it passes down the wire; put your ear to a cable and you hear nothing—until a sudden, sharp crack warns of an escape, short circuit, or lightning strike. As for touch, insulation militates against it. There are things we might avoid touching—shards of broken glass, hot coals, the rotating blades of a motorized cutter—because they give either visual or auditory warning of the dangers they present. But electric current does not draw attention to itself. The live wire gives no hint of the charge it carries. Electricity is treacherous, deceitful. Thanks to its sensorial subtlety, it can hold us fast within the grid without our knowing. And precisely because electricity is so insensible, it is hard if not impossible for consumers to trace its currents. We see ourselves as users of equipment, not of energy, concentrating on obsolescence and wear and tear rather than on the flows that sustain our engirdled lives.

With that we rest our case.

THE CASE FOR THE DEFENSE

Your Honor:

Electricity is not to blame for the deception with which it has been charged. It is a property not of corporations but of life—of life, moreover, that is not confined to the organic domain but that brings vitality to the entire material universe. Indeed, by reclaiming it from the corporate sphere and by creatively retracing its influences on and confluences with our everyday practice, we would discover that electricity actually has the potential to undo the very division between real and counterfeit worlds for which the prosecution holds it responsible, restoring an enhanced awareness of the flows of materials and energy in which all practice necessarily subsists. Here we enlist anthropology to our cause. With

its unique perspective on the past and present in the continual reshaping of life, anthropology has a critical role to play in the restoration of this awareness.

We urge you to step back and consider where electricity comes from. Was it conceived in corporate boardrooms to facilitate deceptive intentions, as the prosecution alleges? Was it engineered into the world to buttress these intentions? Absolutely not. Electricity has no point of origin, either in design or execution: rather, it is fundamental to the constitution of matter, of energy, indeed of life itself. From the astrophysical plasmas of the universe to the neurological synapses of living organisms, electricity is abundant and continually so. With or without the presence or existence of human beings, it is intrinsic to the sensory perception and skilled action of countless nonhuman animals, whether in the form of electroreception—the ability to detect electrical stimuli in the environment, which many animals use for finding their way around and for detecting the presence of other organisms of the same or different species, or of bioelectrogenesis—enabling them, for example, to defend themselves or to stun prey by means of electrical pulses that they have themselves produced.⁹ Throughout the long dawn of human prehistory, our ancestors would have encountered electricity in guises quite different from the wired and gridded networks of today. Far from being channeled along narrow lines, it was suffused throughout earth and atmosphere, born of the friction of materials. Of course electricity still makes its presence felt in these guises: for example, in the lightning of a storm or the conflagrations that can result when a bolt strikes the ground.¹⁰ Yet as real manifestations of electricity, such phenomena have been expunged from modern consciousness, leaving a trace only in their iconic representations, such as in the lightning-like zigzag that represents live current, or in the suite of horizontal lines, diminishing in length with depth, by means of which we signify the earth.

Electricity, we contend, is first and foremost a property of materials, as in their movement they rub against one another. It was in the course of the inquisitive movements of human beings, in rubbing up against the materials they worked with, that electricity began to play its part in histories and geographies of culture. Recall that the term itself comes from the Classical Greek *elektron*, meaning amber. It was the physician and natural philosopher [William Gilbert \(1958\)](#), in his treatise of 1600 entitled *De Magnete*, who introduced the term electricity to mean “amber-like.” Gilbert had noticed that lumps of amber, when rubbed, emit a kind of effluvium that attracts other objects to them as if glued to their surfaces. What he did not know was that this effluvium—which we now recognize as electrostatic charge—is common to all materials whose surfaces, observed up



Figure 5. The occurrence of an electrical storm is a vivid reminder that the atmospheres around us are always full of electrical potential. Photo by J. P. Marquis, https://commons.wikimedia.org/wiki/File:Lightning_over_Quebec.jpg.

close, are not in fact homogeneous and impervious but rather intricately meshed, open to exchange and transformation. Whenever materials of any kind are thrown into a frictional engagement, there is an interchange across their thresholds and dispersal into the surrounding medium; in this, amber is no exception. Like other electrostatic materials, it holds the potential to transform across states of matter and energy. Beings equipped with nervous systems—including human beings—can sense these transformations in the confluence of bodies, materials, and media in the concerted movements of feeling, foraging, and forging their ways through the environment. In this practice of life electricity has been active throughout the eons of organic evolution.

On such an evolutionary time-scale, the period of electricity's incarceration within the grid amounts to no more than the blink of an eye.¹¹ For the most part, as a freely distributed property of the material world, its effects have been close to rather than remote from its generative sources. It could not be conducted over any appreciable distance and, unconfined by insulation, it was readily available to be picked up by the senses of living organisms primed to do so. Thus remoteness, conduction, insulation, and sensorial subtlety are not properties of electricity as such, but only of the way in which it has been engineered during the machine

age to support projects of large-scale control over people and resources. Thus it is not electricity that has created a counterfeit world, but the co-optation of electricity in the service of corporate industry and the neoliberal state. Moreover, even if we accept as our point of departure the conditions of today's wired world, there is no reason to suppose that wiring must have the consequences that the prosecution attributes to it. To be sure, if current is to be passed along wires, then this requires both conduction and insulation. But electricity does not determine that these wires should be hidden or that the spaces of dwelling should be made to appear wireless. On the contrary, the wiring of the world makes it possible to follow the paths of conductivity—of material exchanges and energy flows—to a degree unparalleled by other forms of energy. We can trace these paths as they cut through surfaces and weave in and around objects.

As we do so, we undergo a radical change of perspective. Objects begin to unravel as their contents spill forth; walls, floors, and ceilings appear permeable rather than solid as wires pass through them unimpeded.¹² Plugs and sockets come to mark connections along a circuit, not impenetrable interfaces between inside and outside. Even outdoors, in the town or city, the lines of electrical conduction wend in and around houses, above and below streets. As they approach more open landscapes they rise up through the ground surface, which also seems less hard and impermeable than before. They go their own way, unhampered by obstacles and supported by high-level structures at the periphery of everyday perception. These are power lines, and we can follow them to their sources in the pulverization and combustion of coal, the ignition of natural gas, the fission of subatomic nuclei, and the harnessing of the aerial flows of wind or the gravitational flows of water over dammed falls. All these physical processes are directly descended from the most fundamental processes of life: whether the intense compression of once-living organisms over geological time or the channeling of planetary forces and media or the constitutive processes of matter itself. In tracing the material lineages of energetic conduction, we weave in and out, both spatially and temporally, crossing the boundaries between persons or objects and environment and between living and nonliving. We begin to perceive the material world as consisting not of discrete entities with bounded interiors, but rather of knots or nodes in an energetic weave that crisscrosses different states of matter and life, without beginning or end.¹³

In defense of electricity, we contend that all of the most important utilities of our industrial age—heating, cooling, lighting, transportation, and telecommunications—rely on the human skills, proficiencies, and materials of an energetic

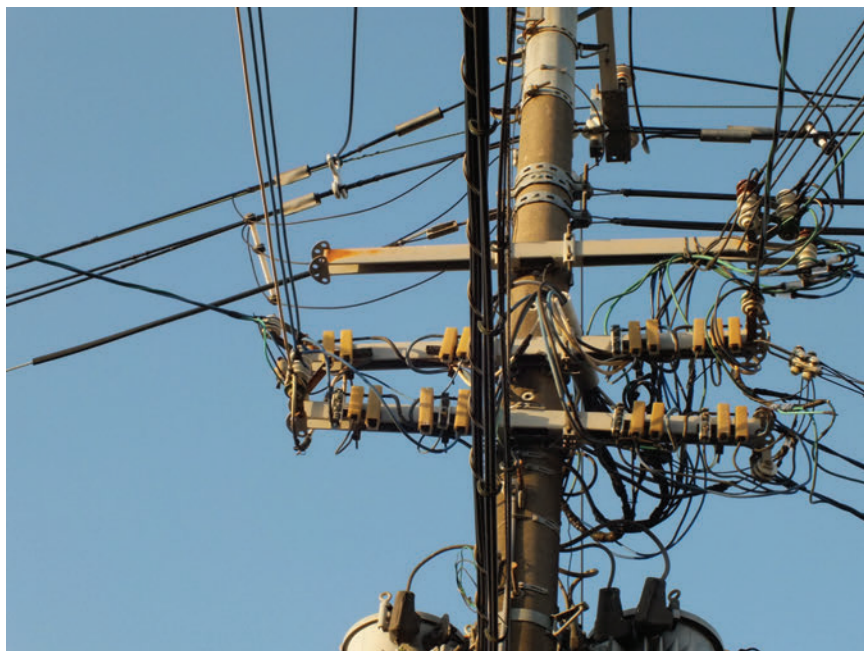


Figure 6. This wending of wires is particularly apparent in countries prone to earthquakes. Here, electrical cables continue to be looped through the sky, rather than underground, on their way towards dwellings. Photograph by Ray Lucas.

weaving. Far from reducing everything to objects, electrical wiring gives us a world that is more comparable to a woven textile.¹⁴ If there are objects in this world, they are but auxiliary to the primacy of the textilic. To be sure, these objective and objectified auxiliaries may be far more evident to our perception than the energetic textility that sustains our everyday life. Nevertheless, electricity makes us realize that in its forms and in form-making practices, the world is not so much built from blocks, as commonly supposed, as it is *woven*.¹⁵ It is the idea of block-building that leads us to think of the built environment as an objective superstructure erected on an infrastructural base. In our defense of electricity, however, and in consideration of the perceptual richness of its material apparatus, we wish to lead a charge against the very idea of infrastructure. For in both the idea and its realization, infrastructure establishes an ultimately controlling apparatus, which secretly and inconspicuously organizes and directs the course of corporatized life from beneath (*infra*) the realms of everyday awareness, revealing itself to our experience only in the form of our dependency upon it.¹⁶

In our charge against infrastructure, we advance a design agenda that would have the potential to engage our perceptual participation in the energetic lineages

of everyday life. It is still the norm in industrial product design to think in terms of enclosed forms or walled-in spaces, which refer back to object-oriented perceptual frameworks such as those of perspective and orthographic drawing. The same is true of mainstream computer-aided design systems, which generate a geometry based on closed-boundary volumes and part-assembly structures. Moreover, prototypes are often made by working with raw materials supplied in block or cylindrical forms, cut to component shapes, and assembled by connectors and surface-to-surface adhesion.¹⁷ Indeed, it is difficult to escape such block-like thinking in industrial practice. Electricity, we propose, offers an escape route. For in place of the block, it affords a topology of lines, a fluid space defined by currents and circulations rather than by surfaces and volumes.¹⁸ Such a topology, transgressing the perceptual and material boundaries of the object, might allow for the realization of radical new forms of material practice—for example, in the weaving of textiles whose very threads are conductive fibers—so as to create compositions of electronic beauty and utility.¹⁹

With that we rest our case.

SUMMING UP

Guilty or not guilty? Do we side with the prosecution in regarding electricity as an industrial phenomenon, largely shaped in the corporate sphere, or with the defense, in asserting that it is no less than a pervasive property of the material world and of life itself, awaiting its intellectual reclamation as creative traces within our own lives? Do we follow the prosecution in highlighting the distance between terminals at the points of generation and application, or the defense in drawing attention to the lines that run between them? Where the prosecution emphasizes surface occlusion, the defense emphasizes entanglement; for one the consumer is enclosed in a cornucopia of objects, while for the other the consumer is at the same time a producer in a weave of things. Where the prosecution links safety and security to insulation, for the defense it is the continuity of lines that affords the possibility for life to carry on. The prosecution charges electricity with deceit; the defense counters that electricity has the capacity to reveal the true extent of our energetic entanglements, even as they launch an alternative charge, against infrastructure, for having kept these revelations under wraps. Whereas for the prosecution, the electrical world is always already hard-wired, for the defense the very idea of hard-wiring is the source of the problem. In truth, they argue, the wiring of the world is perpetually in progress; its continual connection, disconnection, and reconnection mirrors what happens in minds in their ongoing

neurological configuration, and in bodies in their endless probing of the nooks and crannies of quotidian life. Finally, where the prosecution holds electricity responsible for holding us captive in the grid, it is the very sensorial subtlety of electricity and the precision with which it can be delivered—according to the defense—that underpins the emancipatory hope of reactivating the creative potential of the energetic trace.

Ladies and gentlemen of the jury, we await your verdict!

NOTES

1. According to Vilém Flusser (1999, 17–21), deception and illusion are of the essence of design.
2. Elsewhere we have described such a world through detailed case studies (Anusas and Ingold 2013).
3. This era has come to be known, in popular writings, as the Anthropocene (Crutzen and Stoermer 2000).
4. On the transition from steam to electrical power, see Warren Devine (1983); on the creation of the network, see Thomas Hughes (1983).
5. On the domestic, social, and political history of the electrical plug, see Fred Schroeder (1986) and Damon Taylor (2015).
6. On this point, see Tim Ingold (2013, 85–86). This distinction between thing and object is drawn from the philosophy of Martin Heidegger (1971).
7. As Stewart Brand (1994) argues, this arrangement causes complications for maintenance and renewal and goes against the grain of social and ecological regeneration.
8. Breaches of security may also, in extreme cases, be punished with lethal, state-sanctioned electrocution. Here, see Mark Essig (2009).
9. On electroreception and bioelectrogenesis, see Günther Zupanc and Theodore Bullock (2006).
10. On the electrical nature of storms, see Donald MacGorman and W. David Rust (1998). A classic early study is by Joachim Kuettner (1950).
11. This chimes with the perspective of the Long Now Foundation and its ten-thousand-year clock project, which reveals how even the most taken-for-granted and embedded technologies are but passing moments within the expanse of geological time (Brand 2000).
12. Or, as Vilém Flusser (1999, 82–83) puts it, cables have knocked as many holes into the roofs, walls, windows, and doors of the home as in a Swiss cheese. “Home-as-one’s-castle has become a ruin with the wind of communication blowing through the cracks in the walls,” thus disrupting the illusion of a solid and settled architecture.
13. This perception is vividly realized in the work of the Japanese architect Akihisa Hirata. “Architecture,” Hirata (2011, 17) declares, “is the creation of tangles.”
14. On this point, see Tim Ingold (2010). This way of apprehending the world is made beautifully tangible in artist Maggie Orth’s electronic textiles (http://www.maggiorth.com/E_textiles.html).
15. Tim Ingold (2015, 13–17) discusses the implications of thinking of the constitution of the material world in terms of lines and knots rather than blocks, chains, and containers.
16. Here, see Paul Dourish and Genevieve Bell (2007, 416–17). Infrastructures, they argue, “drive and maintain standardization, reflect and embody historical concentrations of power and control, and are instruments through which access is manipulated” (see also Star 1999). In his philosophy of photography, Vilém Flusser (2000, 55) has stressed the capacity of infrastructure to remain invisible and to evade the attention even of its critics.

17. For some insights into these techniques of drawing, computer modeling, and making in industrial product design, see [IDSA \(2003\)](#).
18. [Kengo Kuma \(2008\)](#) strives for such an “anti-object” approach to architecture as he works towards a way of designing that is responsive to material relations, fluidity, and movement. On the idea of fluid space, see [Annemarie Mol and John Law \(1994\)](#).
19. See, for example, [Susanne Küchler \(2003\)](#).

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